

In conclusion I have to point out, as shown by my investigations commenced four years ago, that farmyard manure laid on to the land is only rendered properly available to the crops by the action of bacteria as indicated above in connection with the natural humus. The inorganic forces have little action upon it, except in producing humic acid and other injurious matters.

The most of the soluble mineral substances in a mature soil, it may also be mentioned, are in the form of sulphate. They originate from the primary minerals as carbonate, but are soon altered, mainly by the ferrous sulphate. The sulphate unfortunately is not the most suitable form in which minerals can be presented to plants for absorption, for the simple reason that, being so stable in chemical union, it causes the loss of too much of the plant's energy in the interior of its body before it can be decomposed. It must be remembered that green plants decompose the compounds which enter their system before they utilize their elements or simpler forms in the elaboration of food.

ALEXANDER JOHNSTONE.

Edinburgh, August 5.

#### THE IMPERIAL INSTITUTE AT ST. PETERSBURG.<sup>1</sup>

IN November, 1885, some months after the publication of Pasteur's discovery for the treatment of hydrophobia, an officer of the Russian Guards was bitten by a rabid dog. This officer having been sent to Paris to undergo the treatment, his Highness Prince Alexander Petrowitch d'Oldenburg established, at his own expense, a provincial laboratory at St. Petersburg, where Pasteur's treatment could be duly carried out. This establishment, however, soon proved to be too small for scientific investigations to be properly carried out therein, and it was decided to build a large laboratory in which researches might be made under the best possible conditions; accordingly the same enlightened nobleman bought a piece of ground of 37,464 square metres in extent, on which the present Institute is built.

The buildings comprise physiological, pathological, chemical, bacteriological, and epizootological sections, with their laboratories, under the direction of such men as Neucki, Winogradsky, and others. There is also a department where Pasteur's treatment is carried out, together with a small hospital for infectious cases. Each section is complete in itself, and all the arrangements are on the newest principles and on a very large scale. The expenses are defrayed partly by the Prince of Oldenburg and partly by public subscription, and the whole Institute compares favourably with any Institute in France or Germany.

The directors of the Institute publish every two or three months a volume embodying the scientific results obtained in the laboratories, and the first two numbers have now been published. As might be expected after what has just been said, their contents are of wide and varied interest. Neucki publishes some chemical researches on the microbe producing inflammation of the mammary glands of milch cows and goats, and his paper will specially interest those who in this country have followed the remarkable researches of Dr. E. Klein. Winogradsky gives an account of the various nitrifying organisms discovered by him in the soil of different countries. This author quotes the researches of Prof. and Mrs. Frankland, and of Prof. Warrington, and though to some extent contradictory, Winogradsky's researches agree with those of the English observers in all essential particulars. This paper is certainly the most important which has as yet appeared on this vexed question. The results obtained by Pasteur's treatment in St. Petersburg

form the subject of a paper by Kraïouchkine, and it may be mentioned that the treatment appears to have been as successful at St. Petersburg as in Paris.

The other papers refer to the chemical and physiological effects of tuberculin (Bujwid, Helman), to the transformation of nutritive media by the bacillus of diphtheria, and to the chemical composition of this micro-organism (Dzierzowski and Rekowski), while Blachstein endeavours to draw a distinction between the bacillus coli communis and the bacillus typhi abdominalis, based on the chemical decompositions produced by these organisms in the media in which they grow. Lastly, Mizerski and L. Neucki give a critical *résumé* of the methods used to estimate the quantity of hydrochloric acid contained in gastric juice.

The researches which form the subjects of these papers are varied enough, and whilst congratulating their authors we may express the hope that the Institute will have a long and prosperous career. Our good wishes must be tinged with regret for ourselves—regret that there should not be a similar Institute in England, and regret also that there should be in this country a class of people who will oppose the establishment of such an Institute until a Bishop or Royal Duke has died of rabies.

M. ARMAND RUFFER.

#### NOTES.

LAST week much anxiety was felt as to the health of Sir Richard Owen. On Monday his condition was better, and the improvement, was maintained on Tuesday.

THE herbarium of the British Museum has acquired, by presentation from the widow, the very valuable collection of Muscineæ, made by the late Mr. George Davies, of Brighton. It comprises upwards of 20,000 specimens of mosses, hepaticæ, and lichens, partly gathered by Mr. Davies in Great Britain and on the Continent, partly communicated to him from New Zealand, Samoa, India, the West Indies, and America.

PROF. HIERONYMUS has been appointed curator of the Royal Botanical Museum at Berlin.

THE Exhibition of the Photographic Society of Great Britain was opened on Monday at the Gallery of the Royal Society of Painters in Watercolour. It will remain open till November 10.

WE regret to have to record the death of Mr. George Croom Robertson. He was fifty years of age, and only lately, in consequence of ill-health, resigned the professorship of Mind and Logic at University College, London, to which he was appointed in 1866. Prof. Robertson was well known as a brilliant teacher of the subjects to the study of which he devoted his life, and as the editor of *Mind*. He was associated with Prof. Bain in the editing of Grote's "Aristotle," and was the author of the volume on Hobbes in Blackwood's series of "Philosophical Classics." He also contributed to the latest edition of the "Encyclopædia Britannica."

DR. GEORGE DIXON LONGSTAFF died at Wandsworth on Friday last in his ninety-fourth year. When a young man he was assistant to Dr. Hope, Professor of Chemistry at the University of Edinburgh, and he is believed to have been the first teacher of practical chemistry to medical students in this country. He was one of the founders and a vice-president of the Chemical Society of London.

Students of folklore will be sorry to hear of the death of Reinhold Köhler, librarian at Weimar, where he was born in 1830. He died on August 15. Dr. Köhler was a man of great learning, well known as an authority on the subject in which he was chiefly interested.

<sup>1</sup> "Archives de Sciences Biologiques publiées par l'Institut Impérial de Médecine Expérimentale à St. Pétersbourg," Vol. 1, No. 1 et 2.

THE American Academy of Arts and Sciences has published an excellent "Memorial" of Joseph Lovering, who was a Fellow of the Academy from 1839 to 1892, Corresponding Secretary from 1869 to 1873, Vice-President from 1873 to 1880, and President from 1880 to 1892. Mr. Lovering was born on December 25, 1813, and died on January 18, 1892. The "Memorial" consists chiefly of speeches delivered, and letters read, at a meeting held for the commemoration of his life and services, with a biographical sketch by Prof. J. P. Cooke, Secretary of the Council, and a list of Prof. Lovering's publications. At this meeting the chair was taken by Dr. A. P. Peabody, who said that there was a certain fitness in his leading the proceedings, as Mr. Lovering had been his pupil. Speaking of Prof. Lovering as a teacher of physical science, Prof. J. P. Cooke said: "He was one of the best lecturers I have ever known, and I have known the greatest masters of my time."

DURING the past week the weather has been of a decidedly cyclonic type; large disturbances have reached us with considerable frequency from the Atlantic, and have mostly passed to the northward of Scotland. The winds have been moderate to strong from the south-west, but have at times attained the force of a gale at places in the north and west, while on Tuesday they were boisterous in all parts of the United Kingdom. The rainfall has been somewhat heavy in the north and west, but light in the southern parts of the kingdom, where, during the first part of the period, the weather was generally fine, with occasional mist or fog in the mornings. The temperature has, on the whole, been mild, the day readings ranging from 60° to 65° over most parts, while in the extreme south they have exceeded 70° on several occasions. The *Weekly Weather Report* published on the 24th instant shows that some of the night minimum temperatures during that week were very low for the time of year, the shade thermometer falling to 25° in the east of Scotland, and to between 28° and 31° in most other parts.

AMONG the valuable discussions which appear in the *Repertorium für Meteorologie*, issued under the authority of the St. Petersburg Academy of Sciences, is one in vol. xiv., by B. von Nasackin, on the Storms of the Baltic, being in fact a continuation of similar works (by other authors) for the Black and White Seas. The data used in the discussion are taken chiefly from lightkeepers' journals and stations on the coast. The general results show that the yearly frequency of storms differs considerably in different years, and the number of storms at individual stations also varies considerably. In the western part of the Gulf of Finland and in the south of the Baltic storms are much more frequent than in the other parts. The mean wind-direction lies between south and west, and the principal storms occur from the same direction, and also between west and north. The maximum number occurs almost everywhere in December, and the minimum in August.

*Das Wetter* for August contains an article by Dr. R. Assmann on the treatment of persons apparently killed by lightning. The different effects on persons struck would prove that the intensity of the flash is subject to considerable fluctuations, and recent photographs of lightning, in fact, show that in addition to the principal flash there are always weaker ones branching out in all directions, like the roots of a tree. It may therefore well be assumed that the intensity of the latter is considerably less than that of the principal current. He quotes a case near Berlin in the summer of 1891 where a number of soldiers were struck by lightning; among them an officer, and a bugler holding his horse, were both struck. The officer shortly afterwards recovered, while the bugler was to all appearances dead, but the officer at once adopted the method of artificial

respiration as applied to the apparently drowned, by which means the bugler was gradually brought back to life. Dr. Assmann states that there can be little doubt that if this method were applied soon after the stroke, and continued for at least a quarter of an hour, many of those apparently killed might be restored to life.

A VALUABLE paper by Prof. E. W. Hilgard, on the relations of soil to climate, has been published by the U.S. Department of Agriculture. Soils being the residual product of the action of meteorological agencies upon rocks, it is obvious, as Prof. Hilgard says, that there must exist a more or less intimate relation between the soils of a region and the climatic conditions that prevail, or have prevailed, therein. Prof. Hilgard discusses, both from a theoretical and from a practical point of view, some of the more important phenomena dependent on this correlation, and their effects on the agricultural peculiarities of the chief climatic subdivisions.

HERR K. FLEGEL gives, in the *Allgemeine Zeitung* for September 12, an interesting account of archæological discoveries he has made this summer in the island of Kalymnos, near the coast of Asia Minor. At a height of about 220 metres, not far from Emporió, he found the remains of an ancient fortress which seems to belong to the same class of buildings as those of Mycenæ and Tiryns. The remains, which are comparatively well preserved, include Cyclopean walls and a tower. A gateway (1½ metre in breadth), the forecourt, a cistern, and a stone oil-press survive. In the valley of Vathy, Herr Flegel came upon the remains of walls of an acropolis, which he describes as older than the fortress of Emporió.

IN the new instalment of the proceedings of the Liverpool Geological Society (Part 4, Vol. VI.), Mr. J. J. Fitzpatrick has some interesting notes on the Deep Dale Bone Cave near Buxton. In a paper read before the society in 1890, Mr. Fitzpatrick called attention to this cave, and described the various objects of interest which had been found in it up to that time. In his present paper he gives an account of the results of more recent researches carried on by Mr. W. Millet, of Buxton, by whom the cave was discovered. At the entrance is a refuse heap, three feet thick at the top, extending ten feet on either side of the entrance, and sixty feet down to the stream at the bottom of the dale. Among the objects found in this refuse heap are bones of the horse, stag, Celtic shorthorn (*Bos longifrons*), dog, pig, sheep, goat, wild boar, three flint flakes, a piece of bronze with Celtic pattern, fragments of pottery, including Samian ware, pseudo-Samian ware, Romano-British ware, coins of the Emperor Claudius, and female ornaments, including fibulæ, earrings, brooches, and rings. At the bottom of the heap were found two flint arrow-heads. In the second chamber of the cave a hole, eight feet deep, has been dug. The upper bed, three feet thick, is composed of dark clay, with angular fragments of limestone. The second bed, which is from six to sixteen inches thick, consists of broken fragments of stalagmite, limestone, and gravel. In this a human jawbone has been found. The third bed, the thickness of which has not been ascertained, consists of a stiff yellow clay, containing large pebbles, two of which have been artificially pointed at one end. The human jawbone has twelve teeth, with the enamel and dentine in an admirable state of preservation. There were originally fourteen teeth, the two "wisdom teeth" not having been developed at the time of the death of the person to whom the jawbone belonged. The mark of the weapon which gave what was perhaps the death wound is distinctly visible. The weapon penetrated deeply into the bone in a slanting direction, with an upward inclination, and the blow must have been struck from behind. Another object found in the second chamber is a small bronze box, filled with

grey ashes, supposed to be the ashes of a cremated person. The lid is moulded with the raised zigzag pattern common in Roman ornamentation, the hollow parts being let in with red and green enamel. In the lower chambers, as stated in Mr. Fitzpatrick's former paper, the following mammalian remains have been found:—A skull of the brown bear (*Ursus arctos*), a skull of the Celtic shorthorn (*Bos longifrons*), teeth of the reindeer (*Cervus tarandus*), and of the red deer (*Cervus elaphus*), part of the skull of the wild boar (*Sus scrofa*), and some human bones.

THE July number of the *Korean Repository* opens with an article by the Rev. Dr. Edkins on the Persians in the Far East. He shows from native sources that at a very early period the influence of Persian ideas penetrated into China. The wide acceptance of these ideas was due in part to the doctrine of a future life, but Dr. Edkins attributes even more importance to the worship of the god of fire as the special ruler of the hearth and the god to be worshipped by newly married people. This, he says, is so adapted to the natives of Eastern countries with their strong family instincts, that it has easily kept its place and still has a firm hold on the popular mind. In another article a writer who signs himself "Viator" indulges in much enthusiastic admiration of Korea and the Koreans. He is especially emphatic in his praises of the scenery around Seoul, with its "grand amphitheatre of granite hills." "The city wall," he says, "climbing over the most precipitous ridges, the sentinel peaks of Nam San, with its chevelure of fine trees, and the bold castellated rocks of Poukan, which on the south and north respectively keep guard over the capital, with many other points both within and without the walls commanding varied and extensive views, would alone in any tourist-frequented land make Seoul a show-place of the guide-books." The ordinary Korean he describes as "a docile and happy creature."

WE learn from *La Nature* that MM. Olivet, of Geneva, have brought out a new system of electric heating applied to conservatories, which may prove very useful where a motor force is at one's disposal. A dynamo, worked by some motor, sends the current into receivers of special metallic composition, which become rapidly heated, but without exceeding a certain temperature. A heated air current is set up as with steam-heating. The advantages of the system are: Absence of all unwholesome gas or vapour which might injure the plants, simplicity of construction in the parts conveying the energy, perfect safety as regards heat, which can be regulated at will, convenience and rapidity in starting and extinction, and cleanliness.

MR. A. C. MACDONALD, of the Agricultural Department of Cape Colony, refers with much regret (in the official publication of the Department) to the senseless way in which the ant-bear is being exterminated. This animal, he says, is one of the few indigenous four-footed friends of the Cape farmer. "Its food is the ant, more especially the white ant, an insect which feeds on our crops and the succulent herbage of the veld, and which does much greater damage than is generally supposed. Although the ant has numerous enemies (among which is reckoned the koran, a bird which I am happy to say is now being preserved on some farms solely for this purpose), yet none are so destructive to its welfare as the ant-bear. It is only when on the surface of the ground that the ant runs any danger from its winged foes, but above or below ground it is always within reach of the ant-bear. But it is not only as a destroyer of ants that the ant-bear is of value to the farmer. A large percentage of the seeds of our herbage, after they have dropped off the plant on the hard ground, lose their germinating power from being exposed day after day to the scorching rays of the sun. The ant-bear, as it goes scratching about for ants, covers a large number of seeds with loose earth, in which congenial bed they will retain their repro-

ductive power for a long period, awaiting the moisture from the skies to shoot out and propagate their kind. And yet this animal, harmless in other respects, is being slowly but surely exterminated. For its skin, which is valued at about 15s., and also for its flesh, which resembles superior pork, it is sought after by the natives. With the white race 'sport' is the inducement, this fun taking the form at times of forcing the poor brutes out of their holes by flooding with water, or drowning them and digging them out afterwards."

PROF. G. C. CALDWELL, of Cornell University, has been making oleomargarin a subject of careful investigation, and presents the results of his researches in a valuable paper in the September number of the *Journal of the Franklin Institute*. He thinks that if made of unsuitable materials oleomargarin may contain germs of disease, and that the process of manufacture ought to be carefully inspected by capable officials; but there is no positive proof, he says, that it is now, or ever has been, made of such materials, or that any disease has ever been communicated to man by its use. He is also of opinion that, when properly made from fresh and clean materials, it differs but slightly in healthfulness from butter. He records, however, a rather significant incident which has recently come to his knowledge. At an asylum for blind children, in Louisville, Ky., where good butter had been supplied, good oleomargarin butter was substituted. No notice was given of the change, and even if the appearance of the substitute would have betrayed it, the blind children could not have seen it. There was no evidence that they were in any way conscious of the change; but it was observed that they gradually ate less and less of the new butter and finally they declined it altogether. No bad effect on their health could be discerned. They made no complaint in answer to the inquiry as to the reason for not eating the butter other than that they did not care for it. It was as if it did not adapt itself to any need of the system. "This," says Prof. Caldwell, "certainly must be allowed to count against the complete fitness of oleomargarin as a substitute for butter."

A FIELD NATURALISTS' CLUB was formed last year in Trinidad, and seems likely to do much useful work. It publishes a journal, and in the third number, which we have received, gives reports of its meetings from the beginning. In the meeting on January 8 Mr. Mole announced that he had found a *Peripatus Edwardsii* in the St. Ann's Valley; and Mr. Ulrich stated that he also had found a specimen of the same species at Azouca.

THE report of the Government Central Museum, Madras, for 1891-92, has been published. In an interesting appendix Mr. H. Warth, the officiating superintendent, gives an account, among other subjects, of the tin district in Burma. The tin-bearing deposits are, he says, of two kinds. First, there is the tin gravel which is found in all or most of the valleys, a mixture of rough white quartz pebbles with sand, garnet, black tourmaline, and grey cassiterite. The thickness of the gravel varies from 1 to 6 feet, and the yield of cassiterite may be put down as at least  $\frac{1}{4}$  per cent. or 1 pound of cassiterite (tin dioxide) in 400 pounds of gravel. There are washings going on at many places, but some valleys have been more or less exhausted. The work suffers also under the disadvantage that the greater part of the country is quite uninhabited, that food has to be brought from a distance, and that there is always danger of sickness. Chinamen are the chief workers. The second kind of tin-bearing deposit is the original eruptive rock, which is weathered so that it is possible to wash out the grains of whitish cassiterite which it contains. Mr. Warth visited the principal deposits of this kind near Malewun in July 1891. He took samples from several excavations and washed them. The mean is a yield of only 0.04 per cent. of impure wash tin.

Thus one pound of impure tin dioxide requires 2500 pounds of weathered rock. The rock is traversed by a series of parallel veins of white quartz indicating the origin of all the white quartz pebbles in the tin-bearing gravels, these gravels being nothing but the accumulation, during probably thousands of years, of the washings from the elevated outcrops of tin-bearing eruptive rock. The original tin-bearing deposit of weathered rock has been washed during a good many years. It requires a very good supply of water and very large deposits, otherwise the labour would be far too great and such works could not compete with those in the gravels. Among the rock specimens of the district are also grey limestones from Mount Tampra, three days' canoe journey from Lenya. This mountain Mr. Warth found fringed with caves which most likely owe their origin to the action of the sea. As they are now 160 feet above the sea, it appears that the land has been raised that much in comparatively recent time. If so, then the time during which most of the tin gravels formed was also comparatively limited.

THE third part of the tenth annual report of the Board of Fishery for Scotland has just been issued. It deals with the scientific investigations carried on during 1891. First there is a general statement of the results achieved; then comes a series of general reports; and these are followed by papers recording biological investigations. Finally, Dr. T. Wemyss Fulton gives an account of contemporary scientific fishery investigations in this and other countries. The following are the papers dealing with biological investigations: On the food of fishes, by W. R. Smith; observations on the reproduction, maturity, and sexual relations of the food fishes, by Dr. T. W. Fulton; additions to the fauna of the Firth of Forth, part iv., by Thomas Scott; contributions to the life-histories and development of the food and other fishes, by Prof. McIntosh, F.R.S.; on two large tumours in a haddock and a cod, by Prof. Prince and Dr. J. L. Steven. We may note that the volume is enriched with many admirable plates.

MESSRS. R. FRIEDLÄNDER AND SON, Berlin, have just issued the sixth annual report (for 1890) of the ornithological stations of observation in the kingdom of Saxony. The report has been prepared by A. B. Meyer and F. Helm, who have evidently spared no pains to make their work thorough and accurate. In an appendix observations relating to other animals in Saxony, besides birds, are recorded. There is also a list of the birds which up to the present time have been observed in that country, with notes as to their geographical distribution elsewhere.

THE Clarendon Press has reprinted Mr. J. G. Baker's "Summary of New Ferns discovered or described since 1874."

A WORK on "The Great Barrier Reef of Australia, its Products and Potentialities," by Mr. W. Saville-Kent, is to be issued by Messrs. W. H. Allen and Co. The barrier reef of Australia, represented by a vast rampart of coral origin, extends for no less than twelve hundred miles from Torres Straits to Lady Elliot Island on the Queensland coast. Between its outer border and the adjacent mainland it encloses a tranquil ocean highway for vessels of the heaviest draught. To the naturalist, and especially to the marine biologist, the entire barrier is described as "a perfect Eldorado, its prolific waters teeming with animal organisms of myriad forms and hues, representative of every marine zoological group." The author's object will be to render an account, in clear and popular language, both from a commercial and from a biological standpoint, of the most attractive subjects connected with the barrier region. There will be sixteen plates in chromo-lithograph, with grouped illustrations produced from original water-colour drawings by the author, and forty-eight plates in photomezzotype from original negatives.

NO. 1196, VOL. 46]

THE New Zealand Institute has published its Transactions and Proceedings during 1891 (vol. xxiv., seventh of new series). The volume is edited by Sir James Hector, and contains many papers of considerable interest and value. The papers presented in the Transactions are grouped under the headings of Zoology, Geology, Botany, and Miscellaneous. The Proceedings include those of the Wellington Philosophical Society, the Auckland Institute, the Philosophical Institute of Canterbury, the Otago Institute, the Westland Institute, the Hawkes Bay Philosophical Institute, and the Nelson Philosophical Society.

THE *Journal of Botany* for September gives an account of the results of M. J. Bornmüller's botanical exploring expedition in Persia. The flora of the district visited is a very abundant one, but not many new forms were gathered. The mountain sides of Kuh Jupar, at a height of between 2900 and 3000 metres, were covered with dense forests of an undescribed species of *Ephedra*.

THE number of the *Oesterreichische Botanische Zeitschrift* for September is almost entirely devoted to the discussion of the question of botanical nomenclature, and the opinions on the various disputed points, of the leading English and Continental botanists.

MESSRS. CROSBY LOCKWOOD AND SON announce the following works:—"The Microscope: its Construction and Management," by Dr. Henri von Heurck, Director of the Antwerp Botanical Gardens, translated from the French by Mr. Wynne E. Baxter, F.R.M.S.; "Electric Ship-Lighting: a Practical Handbook for Electrical Engineers and others," by J. W. Urquhart; "Toothed Gearing: a Practical Handbook for Office and Workshop," by a Foreman Pattern Maker, author of "Pattern Making," &c.; "The Mechanics of Architecture: a Text-book for Students," by E. W. Tarn; "The Visible Universe: Chapters on the Origin and Construction of the Heavens," by J. E. Gore; "The Health Officers' Pocket Book: for Medical Officers of Health, Sanitary Inspectors, Members of Sanitary Authorities, &c.," by Edward F. Wilmoughby, M.D. (Lond.); "The Art and Science of Sail Making," by Samuel B. Sadler, practical sail maker; "The Complete Grazier and Farmers' and Cattle Breeders' Assistant: a Compendium of Husbandry, originally written by William Zouatt, thirteenth edition, entirely re-written, considerably enlarged, and brought up to the present requirements of Agricultural Practice," by William Fream, LL.D.; "Farm Live Stock of Great Britain," by Robert Wallace, professor of Agriculture and Rural Economy in the University of Edinburgh, third edition, thoroughly revised and considerably enlarged; "Tramways: their Construction and Working," by D. Kinnear Clark, M.Inst.C.E., new edition, thoroughly revised, in one volume; "The Wood-worker's Handy Book: a Practical Manual embracing information on the Tools, Materials, and Processes employed in Wood-working," by Paul N. Hasluck; "The Metal-worker's Handy Book: a Practical Manual embracing information on the Tools, Materials, and Processes employed in Metal-working," by Paul N. Hasluck; "Practical Lessons in Roof Carpentry," by Geo. Collings; "The Steam Engine: a Practical Manual for Draughtsmen, Designers, and Constructors, translated from the German of Herman Haeder, revised and adapted to English Practice," by H. H. P. Powles.

MESSRS. BELL AND SONS are about to publish the following books:—"The Student's Hand-book of Physical Geology," by A. J. Jukes-Brown, with numerous diagrams and illustrations, second edition, revised and much enlarged (Bohn's Scientific Library); "Sowerby's English Botany," Supplement by N. E. Brown, of the Royal Herbarium, Kew (to be completed in eight

or nine parts); "Fungus Flora," a classified text-book of Mycology, by George Massee, author of "The Plant World," with numerous illustrations, 3 vols., vols. i. and ii.; "The Framework of Chemistry," Part I, by W. M. Williams.

UNIVERSITY COLLEGE, Liverpool, has issued its prospectus of day classes in arts and science, and of the evening lectures, for the session 1892-93.

PART 48 of Cassell's *New Popular Educator*, with title-page and contents to vol. viii., has been issued. The next monthly part of the work will form the first part of a technical series of Cassell's *New Popular Educator*, published under the title of Cassell's *New Technical Educator*.

MESSRS. DULAU AND CO. have published a catalogue of works on electricity, galvanism, and magnetism—works which they offer for sale.

FOUR lectures on Cholera will be delivered by Dr. E. Symes Thompson in Gresham College on October 4, 5, 6, and 7, at six o'clock p.m. The lectures will be free to the public.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♂) from India, presented by Mrs. Trafford Rawson; a Green Monkey (*Cercopithecus callitrichus* ♂) from West Africa, presented by Mr. A. de Turckheim; two Tigers (*Felis tigris* ♂ & ♀) from India, presented by the Maha Rana of Oodeypore; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mr. Hugo Marshall; a Three-striped Paradoxure (*Paradoxurus trivirgatus*) from Java; presented by Mr. Douce; a Jackdaw (*Corvus monedula*), British, presented by Lt.-Col. R. F. Darvall, F.Z.S.; a Common Fox (*Canis vulpes*), British, presented by Mr. Lucius Fitzgerald; an Indian Cobra (*Naja tripudians*), an Indian Rat Snake (*Ptyas mucosa*) from India, presented by Mr. Arthur H. Cullingford, F.Z.S.; a Common Boa (*Boa constrictor*) from St. Lucia, W.I., presented by H. E. Sir Walter F. Hely Hutchinson, K.C.M.G.; a Common Chameleon (*Chameleon vulgaris*) from North Africa, presented by Miss Withers; two Tarantula Spiders (*Mygale*, sp. inc.) from Demerara, presented by Mr. H. Strong; a Black-headed Lemur (*Lemur brunneus* ♀) from Madagascar, a Duyker-Bok (*Cephalophus mergens* ♂) from South Africa, two Demoiselle Cranes (*Grus virgo*) from North Africa, four Emus (*Dromaeus novaehollandiae*) from Australia, deposited; an Indian Chevrotain (*Tragulus meminna*) from India, two Violet Tanagers (*Euphonia violacea*) from Brazil, a Shag (*Phalacrocorax gracilis*) British, purchased; three Wild Swine (*Sus scrofa*) born in the Gardens.

### OUR ASTRONOMICAL COLUMN.

THE VARIATION OF LATITUDE AT PULKOVA.—*Astronomische Nachrichten*, No. 3112, contains two communications on the variation of the latitude at Pulkova, the first by Mr. B. Wanach, who discusses some old observations, and the second by Mr. S. Kostinsky, who has continued the former's recent observations made before July, 1891. During the years 1890 and 1891, Mr. Wanach obtained some very definite results with regard to this question by using the large Pulkova transit instrument in the Prime Vertical, and the object of the present discussion is to find out if any like result can be discovered. The observations used are those of W. Struve made between the years 1840-55, O. Struve 1858-9, Oom 1861-63, and Nyren 1879-82. If we employ those made in the years 1840-42 it is at once noticed that to satisfy the conditions a variation in the height of the pole of  $\pm 0''.1$  has to be assumed, while the maxima and minima occur at different months of the year, the latter on September, 1840, May, 1841, March, 1842, and the former on January, 1841, September, 1841, and October, 1842. The observations from 1843-63 present no direct fluctuations in the value of the mean pole height, but show that it remains constant

or is proportional to the time during the whole period. Taking the values of the mean pole height for the years 1879-82, as obtained from a similar curve, it is found that a single sinus curve is not sufficient for the comparison; secondly, that the mean pole height is not the same as it was in 1841 and 1891, but is about  $0''.15$  greater; thirdly, that the chief maximum on March, 1881 coincides with the chief minimum on September, 1880, that is, exactly coincides with the phases of the pole height. It also happens that the series, which take more than two years, give only one distinct maximum and minimum (instead of two, as would be expected). Coming now to Mr. S. Kostinsky's work, whose observations were made by W. Struve's method with the aid of a large transit instrument by Repsold, the variation of latitude is clearly shown. With the aid of the curve, which accompanies the paper, the maximum of the latitude occurs on October 4, 1891. Owing to the observations not being quite complete, the epoch of minimum is uncertain, but the curve shows that it will take place somewhere before the end of the month of May 1892. Comparing this curve with that obtained by Mr. Wanach in the year 1891, we have for the dates of the greatest and least values of the latitude—

|                                 |                                 |
|---------------------------------|---------------------------------|
| Max. in 1890, September 14.     | $\phi = 59^{\circ} 46' 18''.39$ |
| Min. „ 1891, April 15           | 17'.79                          |
| Max. „ 1891, October 4          | 18'.44                          |
| Min. „ 1892, May 20-31 (about). |                                 |

DOUBLE STAR OBSERVATIONS.—The second part of Appendix I. to the *Washington Observations* for 1888 contains the observations of double stars made at the United States Naval Observatory during the period 1880-1891, by Prof. Asaph Hall. These observations have been made with the intention of carrying on the work that was begun with the same instrument in 1875. The stars here observed are mostly known binaries. Some are of special interest on account of their short periods, while again the motion of others will be found to be very slow. This volume will be welcomed by all double star observers, for in such a work as this a strict comparison of observations is needful in such measurements as are here dealt with. The form in which the observations are printed is the same as was the case in 1881. The star's name is first given, followed by its right ascension and declination, and its magnitude. In the first column the date of observation in years and decimals of a year is given, while in parallel columns the sidereal time of observation to the first decimal of an hour, position angle, distance, and weight of observation are similarly inserted; in two other columns the magnifying power employed and occasional notes are added for reference. The volume concludes with an index of all the stars observed. The numbers of the stars are for the most part those of the Struves; but Prof. Hall, in recording those faint stars in the Pleiades, has referred them to Bessel's list of fifty-three stars in this group. Bessel's stars themselves he has numbered in the order they appeared in the *Astronomische Untersuchungen*, first volume, p. 237.

SOLAR OBSERVATIONS AT ROME.—In the August number of the *Memorie della Società degli Spettroscopisti Italiani*, Prof. Tacchini contributes, in tabulated form, the results of the solar observations made at the Royal Observatory during the second three months of this year. Considering first the faculae, they seemed most numerous on the southern hemisphere, there being an excess of 13. Latitudes  $20^{\circ}$  to  $10^{\circ}$  north, and  $20^{\circ}$  to  $30^{\circ}$  south, were the zones of greatest frequency, the number recorded being 49 and 50 respectively. Taking the whole numbers for both hemispheres the table shows a distinct increase, the numbers for the three months being 71, 75, and 97. With reference to the spots, the two hemispheres seem to have been evenly distributed, the numbers seen amounting to 48 and 46 respectively. The zones of greatest frequency were found to be  $\pm 10^{\circ} \pm 20^{\circ}$ , the number of spots recorded being 29 and 22; but in zone  $-20^{\circ} - 30^{\circ}$  as many as 19 were noted, the number in the corresponding zone of the northern hemisphere amounting only to eight. The record of eruptions for this period is not very high, six only being seen in the northern and three in the southern hemisphere; the zone of maximum frequency for the northern hemisphere is  $+10^{\circ} + 20^{\circ}$ , the same as that for spots, the six observations occurring in this zone alone; for the southern hemisphere the three eruptions were observed in each of the  $10^{\circ}$  zones included between  $-10^{\circ}$  and  $-40^{\circ}$ .